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COMMUNICATIONS

CHRONIC PROGRESSIVE OPHTHALMOPLEGIA EXTERNA, OR "INFANTILE NUCLEAR ATROPHY"* (Moebius)

BY

W. H. McMULLEN, LONDON AND M. L. HINE, LONDON

IN Volume I of "Neurology of the Eye," published in 1900, Wilbrand and Saenger grouped as a clinical entity certain cases of external ophthalmoplegia, which, in their opinion, had definite characteristics, which separated them, not only from the congenital cases of this affection, but also from the cases definitely due to some toxic cause, or to syphilis, or associated with wider spread manifestations of nervous disease.

These cases, according to these authors, have the following characteristics:

There is a gradual onset, generally in infancy or early childhood, more rarely in later life, of a bilateral, progressive paralysis of the external eye muscles, not associated with other signs of disorder of the nervous system, nor with fever. The disease may come to a standstill permanently, or for long periods, at any stage of its

* A paper read before the Sections of Neurology and Ophthalmology of the Royal Society of Medicine, on March 10 and 11, 1921.

development, but generally ends in complete, or nearly complete, external ophthalmoplegia. In most cases both sides are affected from the beginning, but sometimes it appears on one side long before the other; often the two sides are unequally affected in the early stages.

Ptosis is generally the first sign, and may be for a long time the only one. When the muscles of the eyeball become affected diplopia may be complained of, but this symptom is only rarely noted, principally because the paralysis develops gradually, and often symmetrically, on both sides, and because it frequently comes on in childhood before the function of binocular vision is fully developed.

The progress is often extremely slow, and thirty or forty years may elapse between the appearance of the first symptoms and the development of complete ophthalmoplegia.

The general health is not affected, and there is a noteworthy absence of signs indicating disease in other parts of the nervous system.

Since the 32 cases collected by Wilbrand and Saenger few similar cases have been reported.

In 1912 one of us (W. H. McM.), brought a case which seemed to be of this nature before the Ophthalmological Society, and recently the other (M.L.H.) has seen two similar cases, one of which was shown at a meeting of the Ophthalmological Section of the Royal Society of Medicine in 1919, while the other is recorded here for the first time.

We propose to describe these three cases together, and then to discuss their probable origin, and the various views that have been held as to their relationship with some other similar conditions, as it is by no means generally admitted that Wilbrand and Saenger are justified in regarding such cases in a separate group.

CASE 1.—*Wm. L——*, seen first in 1911, at the Royal Westminster Ophthalmic Hospital; he was then aged 32.

History.—There were no signs of paralysis in early childhood. When two years of age he had one fit of "convulsions," but no other illness of any importance until he was five or six years old. He then began to suffer from headaches, on account of which he had to be kept away from school a good deal. These headaches gradually became worse. The pain was usually on the left side of the forehead, but occasionally on the right. The attacks usually lasted about half a day, recurring three or four times a week. They were not accompanied by vomiting.

When eight years old he had left ptosis, lasting one month, and recovering spontaneously. According to his mother, he had diplopia for a time when he was 7-9 years old. When 9 years old (in May, 1888), a year after the first transient attack of

ptosis, the drooping of the left lid recurred. This time the paralysis was preceded by an aching pain in the left brow for two or three days. About a month later he was taken to St. Thomas's Hospital* where the following conditions were noted: Incomplete ptosis on the left side, and defective action of the L. internal rectus. On looking at a close object the L. eye diverged. No other defect of ocular movements. Pupil reactions normal. No fundus changes.

Eleven days later there was R. ptosis also, the right lid being slightly lower than the left; there was still much pain in the left temple.

Nine days later he was admitted (on June 27, 1888), under Mr. Nettleship. The right ptosis became much less while he was in hospital, and after five weeks it was very slight. Shortly after leaving the hospital he had an illness which was called "rheumatic fever." After this the ptosis became worse, so that he had to throw his head back in order to see.

Two years later, when 11 years old, he went to St. Thomas's Hospital again. By that time he had incomplete ptosis on both sides, rather more marked on the right side. Both eyes were almost immovable, the right more so than the left. There was hardly a trace of convergence. The pupils were normal, and he could read J.1. Patellar reflexes were normal.

Almost complete bilateral ophthalmoplegia externa had therefore developed in three years from the first onset of ptosis.

When 12 years old, he was seen by Mr. Johnson Taylor, who found no change in the condition of the ocular muscles, but noted that there was, in addition, slight weakness of the "lower" facial muscles, especially the right, and some weakness of accommodation.

R.V. 5/18. c. $-0{\cdot}75$ sph. $=5/6$. c. $+1=$J.1.
L.V. 5/5 & J.6. c. $+2=$J.1.

The patient states that the ptosis became rather less marked when he was about 14-15 years old, since which time there has been no change. There is a history of some difficulty with micturition 3-4 years before 1911, lasting 3-4 weeks only, viz., some difficulty in starting.

Family History.—Father a "rackety" man, who drank. Died "paralysed." Mother died of "cancer" in 1914. Had following family: 1. Girl. Born 1876. Has some defect of vision. 2. Boy. Born 1877. No defect of vision. 3. Early miscarriage. 4. Patient. Born 1879. 5. Still-born at 8 months. 6. Boy. Died at 6 months from "convulsions."

Patient has following family: 1.—Girl. Born 1906. Has slight concomitant squint. She has been examined by W. H. McM. and

* We are indebted to Mr. A. C. Hudson, who in 1912 was Ophthalmic Registrar to St. Thomas' Hospital, for looking up the notes of this case, and sending an abstract.

found to have no palsy. 2. Boy. Born 1907. Has "infantile paralysis" (?) in R. forearm: onset aet. 8-9 months with "bad cold." 3. Boy. Born 1905. No defect. Patient knows of no deformity or defect of nervous system in any other relations.

Condition in 1912. Incomplete ptosis R. and L., rather more on R. side than on L. As a rule about half the cornea was covered in the right eye and a trifle less in the left. The ptosis varied in degree to quite a noticeable extent. It was least early in the day, and increased towards night. He was seen at 10 a.m. one morning with the whole of the pupillary area uncovered in both eyes. There was marked compensatory contraction of the frontalis on both sides. The skin of the lids was smooth, with no horizontal folds. When looking forwards horizontally the head was thrown very slightly backwards. The eyeballs were almost immobile. Measurements with the perimeter showed the following range of movement:

	R. eye		*L. eye.*	
Upwards ...	0°	18°	6°	24°
Downwards	18°		18°	
Outwards	2°	10°	6°	14°
Inwards	8°		8°	

No appreciable convergence occurred on looking at a near object. The left eye was then used for fixation. The pupils were equal and reacted to light, occasionally showing rather marked hippus. They also contracted when patient fixed a near object, although there was no appreciable convergence.

R.V.=6/60 −5 sph.=6/9.

L.V.=6/18 −2 sph. −1·5 cyl. ax. hor.= 6/6 pt.

With full correction he could read J1. at a distance of 8" with slight difficulty. His accommodation was, therefore, fairly efficient. He had no diplopia under normal circumstances, but Maddox rod test could be carried out with some difficulty, and showed exophoria of 15° in distant vision and of 7° at a distance of 12". Instillation of cocain caused dilatation of the pupils and slight elevation of the lids, with the appearance of fine transverse folds in the skin.

Ophthalmoscobic Appearances.—In both eyes there was a "large physiological cup," enough to raise a suspicion of glaucoma (but T.n. and V.n.). No other abnormality of fundus in either eye. In the left eye there was a peculiar kind of irregular lental astigmatism, apparently due to a change of form the inverse of lenticonus.

Visual fields, as examined on a McHardy perimeter, showed no defect.

Dr. Gordon Holmes examined him at this time, and was unable to detect any other signs of disease of the central nervous system.

Later History.—In February, 1918, this patient returned to hospital, and was found to have glaucoma in the right eye, with a sector scotoma in the upper nasal quadrant. A trephine operation was performed with very satisfactory result.

Present Condition (February 24, 1921): Pupils react to light; some hippus; contract well on accommodating. Ptosis is rather less marked than before, and is less in the right eye than the left. The whole of the pupil is uncovered in both eyes. Patient can voluntarily raise lids so as to uncover nearly all the right cornea and 4/5ths of the left. On asking him to look up quickly the lids are quite noticeably raised so that the sclera is exposed above the R. cornea and the L. cornea almost wholly uncovered. There are numerous fine transverse folds in both upper lids, more marked on the right side than on the left, and there is also a well marked tarso-orbital fold.

Range of Movement.		*R. eye.*		*L. eye.*	
Vertical	Upwards	6°	16°	7°	19°
	Downwards	10°		12°	
	Lateral	8°		10°	

There would therefore seem to be a definite increase in the range of upward movement in the right eye, but other movements are either stationary or, if anything, slightly diminished.

R.V. c. −6 sph. ⌒ −1·5 cyl. ax. hor. = 6/9 pt.

L.V. c. −4 sph. ⌒ −2 cyl. ax. 170° = 6/6 pt.

Sector scotoma R. eye, upper nasal, including blind spot.

Both discs deeply cupped. T.n. Left field normal.

CASE 2.—Rose B.——, aged 18 years, was brought to the Royal Westminster Ophthalmic Hospital on May 28, 1919, for an opinion as to whether anything could be done to improve her vision by raising the lids.

It was stated that four years previously both upper lids had begun to droop, and at the same time she was noticed not to be moving her eyes properly. The onset was very gradual, and did not occur after any particular illness. She was taken to Moorfields in September, 1915, where the condition of ptosis and external ophthalmoplegia was noted, but her fundus was not examined in that rather busy time. Her eyes had never previously been examined, and the father declared that her vision had always been good. She has always had a very violent temper and been very obstinate, and

her father states that he has sometimes been frightened that she would "go like her mother."

Family History.—Father alive and well. No specific history. Mother died in 1918, in an asylum, of "pulmonary tuberculosis," after being an inmate for seven years.

Her family was as under.

1st child.—Died at age of 4 months. 2nd child.—Miscarriage. 3rd child.—Brother, alive and well, aged 20. 4th child.—Patient, aged 18. 5th child.—Brother, alive and well, aged 17. 6th child.—Sister, alive and well, aged 15. 7th child.—Sister, alive and well, aged 13. 8th child.—Brother, alive and well, aged 11.

Present State.—Patient is a fairly well developed girl, with nearly total external ophthalmoplegia. Ptosis on the right side is almost complete, on the left it is slightly less. In both eyes the range of movement is extremely limited, as shown below.

Range of Movement.		*R. eye.*		*L. eye.*	
Vertical	Upwards	3°	5°	5°	9° (down and in)
	Downwards	2°		4°	
Lateral	Outwards	8°	13°	2°	12°
	Inwards	5°		10°	

To day there is even less movement than indicated by above measurements. The right eye is now almost fixed and inward movement of left eye is not more than 5°. Pupils are equal and active to light and accommodation. There is no weakness of accommodation. No diplopia is complained of. Patient fixes with left eye. There is no convergence. R.V. 6/18, under mydriatic c.+3 sph. ⊃ +1 cyl. ax. 90°=6/18. L.V. 6/12 c. +4 sph.=6/12. Post-mydriatic correction is +0.5 sph. less. With this, patient reads J.2. at 6″ with each eye. Both fundi show scattered fine pigmentary changes of old retino-choroiditis. No other stigmata of syphilis. Wassermann reaction is negative. Dr. Gordon Holmes, who kindly examined the patient in 1919, reported that her reflexes generally are diminished, but otherwise found no changes, apart from the ocular condition.

Treatment.—The patient has been given her correction, as above, fitted into a pair of "orbital ridge" spectacles, as recommended by Mr. Rayner Batten. These she has found very satisfactory, and does not like to be without them. The chief difficulty with them appears to be the equal adjustment of the pressure on the upper lids, and the retention of the curl of the side-pieces in exactly the right position. If this is altered in the slightest way, the pressure

of the "ridges" becomes unequal, and one lid may droop, and the other become sore.

CASE 3.—Was first seen in November, 1919, at a provincial school clinic, a girl aged 12, with the following history:—According to the mother, the eyes were "beautiful" until the child was 7 or 8 years of age, when she noticed that she seemed unable to open her eyes properly if tired or run down. She took her to see Mr. Hugh Thompson, who was then in charge of the clinic, in June, 1917, when she was aged 10. He noted "photophobia," but no affection of the ocular muscles at that time. The drooping has become more constant since then. The mother, had not herself noticed any loss of movement in the eyeballs, but said she had often noticed that the child moved her head round a good deal when looking at anything. The patient has suffered a lot from headache for a long time, but had never had any serious illness, though always rather delicate.

Family History.—Mother, aged 33, alive and healthy. Father, aged 31, killed in the war. Was a healthy man. First child, the patient. Second child, girl, aged 8. Has R. convergent concomitant strabismus, since infancy. No other affection of ocular muscles. No other relatives known to be affected in same way as patient.

Present State.—Patient is a fairly well developed, but somewhat anaemic girl, brought to the clinic on account of the drooping of the lids, above noted, and frequent severe headaches. She has almost complete ptosis, slightly greater right than left. On right side two-thirds of the pupillary area are covered. The movements of the globes are very restricted in all directions, the outward movement being the best in both eyes.

Range of Movement.		*R. eye.*		*L. eye.*	
Vertical	Upwards	12°	17°	12°	19°
	Downwards	5°		7°	
Lateral	Outwards	20°	25°	15°	25°
	Inwards	5°		10°	

There are no fundus changes. R.V. c. +1 sph. ⊃+0.5 cyl. ax. 180°=6/6 and J.1 at 5". L.V. c. +0.75 sph. ⊃+0.75 cyl. ax. 180°=6/6 and J.1 at 5". There is no diplopia at 12". She fixes with left eye and has no convergence. Wassermann reaction negative. No stigmata of syphilis. Dr. Gordon Holmes has reported that he can find no evidence of other lesion of nervous system, apart from eye condition.

Referring again to the literature, in addition to those collected

by Wilbrand and Saenger, similar cases have been reported by Beaumont, Ayre and Altland. Beaumont's cases, twelve in number, are of considerable interest. They were characterized by being :—1. Familial; 2. Never congenital; 3. Slowly progressive; 4. Never fatal.

Ayre's patient was a boy, whose maternal grandfather had been similarly affected.

Altland's case is described in a paper entitled "A contribution to the study of Chronic Progressive Ophthalmoplegia." The onset was at the age of 22, with ptosis of the right upper lid. Twenty years later ptosis of the left upper lid occurred. When seen at the age of 51 there was complete ptosis of the right upper lid, incomplete ptosis of the left upper lid, and the globes were immovable. "There were no manifestations nor history of syphilis, and there were no marked anomalies in the rest of the nervous system."

In 38 of the cases mentioned above the age of onset has been recorded. In 20 cases it was before the age of 20 years, in 12 between 21 and 30, and in 6 only was it over 30.

As regards the question of syphilis, in none of our cases has the Wassermann reaction been positive, and none of the patients has shown any of the "Hutchinson triad" of signs of the inherited disease. In the second case, however, there are definite evidences of an old diffuse retino-choroiditis, which has affected the vision to some extent. This had been entirely overlooked, prior to her examination in 1919, and hence is probably of long standing. The patient's mentality also appears rather below normal, and she is subject to such violent fits of temper that some wider spread cerebral degenerative changes may be suspected.* In neither of the other cases was Dr. Gordon Holmes able to find other evidence of disease of the nervous system.

The question arises as to whether this class of case is to be considered in a separate group. There are cases of congenital ocular palsy presenting a similar clinical picture in which there is evidence that nuclear defects are the cause. Moebius grouped together, under the name of Infantile Nuclear Atrophy, some cases of ophthalmoplegia externa developing in childhood with a number of others of congenital origin.

Henry Cooper, in 1910, described a family in which several cases of congenital external ophthalmoplegia had occurred, attributing the condition to nuclear atrophy, but without giving reasons for so doing.

Bradburne, in 1912, described 16 cases of hereditary ophthalmoplegia externa, occurring in five generations, and while he ascribed

*See addendum at end of paper.

the condition to "arrested muscular development," Mr. Beaumont, on the other hand, pointed out that it was quite possible that these cases might be entirely analogous with those coming on later in life.

Then again Crigler, in 1914, described a case of ptosis and external ophthalmoplegia, without affection of the intraocular muscles, in a patient aged 60, in which the condition had, as far as could be ascertained, "always existed." This case he also attributed to lack of development of the nuclei supplying the ocular muscles.

In the absence of post-mortem examination, or of some operative interference with the orbital muscles for some reason or other, it may be impossible to say whether such congenital cases are due to imperfect muscular development, as in the case described by Heuck in 1879, or to imperfect nuclear development, but it would certainly seem probable that some, at least, are due to the latter cause. Few examinations have hitherto been made in such cases, but Siemerling, in a case of congenital ptosis, found an atrophic condition of the third nerve nucleus, and Heubner has also shown that this condition, in one case, was associated with an "aplasia" of the corresponding nuclear region.

Gowers, however, in his "Diseases of the Nervous System," does not very definitely dissociate "chronic progressive ophthalmoplegia" from other forms of ophthalmoplegia, caused by syphilis, etc. He does say, however, that "in some cases, and in younger subjects, the degenerations seem to be due to deficient vital endurance of the structures concerned, varying in degree so as to be manifested at birth or not till later life."

It may be pointed out here that, while Wilbrand and Saenger excluded all congenital cases from this group, differentiating these from the fact that they are non-progressive, it is difficult to get accurate records of the range of movement in such cases, which one can compare with another record taken after a sufficiently long interval. It may well be the case that if such patients were seen at the earliest age at which the range of movement could be noted on an arc perimeter, and were then kept under observation for twenty or thirty years, in many cases some increase in the defect would be noticed. The cases could then definitely be included in the group under consideration.

Oppenheim has pointed out that there is a closely allied rare condition, which is known as "The Infantile Form of Progressive Bulbar Paralysis," which is characterized by its hereditary and familial tendencies, and has been found to occur in brothers and sisters whose parents are closely related. In this disease the nuclei of the various cranial nerves are progressively, though slowly, affected, first those of the ocular muscles, and later those of the pharynx and larynx.

On the whole it would appear then that there is no very sharp dividing line between many cases of congenital ophthalmoplegia externa and some of those developing later in life, or between the latter and the condition of "hereditary progressive bulbar paralysis" mentioned above. All may be due to an "abiotrophy" or "lack of inherent vitality" of the specialized cells of the cranial nerve nuclei involved, the time of onset depending on the degree of vitality with which these cells were originally endowed.

Though Siemerling states that this affection may be entirely localized, there appears to have been no pathological examination of any uncomplicated case of the condition under consideration. Oppenheim, in his textbook published in 1911, says that in none of the cases of chronic external ophthalmoplegia, up to then examined post-mortem, had the affection been limited to the nuclei of the ocular nerve, as stated by Siemerling. Clinical experience also shows, he states, that in the majority of cases the chronic ophthalmoplegia is mainly the precursor or the local symptom of a complicated disease of the central nervous system, such as tabes, general paralysis, combined column disease of the spinal cord, disseminated sclerosis, an atypical form of progressive bulbar paralysis, and even progressive muscular atrophy or chronic anterior poliomyelitis. But in view of the series of cases recorded by Willbrand and Saenger, and those of Beaumont, Altland, etc., it is important, from the point of view of prognosis, in the interest of the patient and his or her relatives, to realize that in quite a number of these rare cases there may be no threat to life, and no development of further serious organic disease, and to lay stress on this fact, even though there may be no good pathological ground for separating such cases from those in which the degenerative changes in the nervous system are wider spread, it may be useful to regard them in a separate group, though we may also class with them some, at any rate, of the congenital cases.

The diagnosis of this group can, in the first place, be only a tentative one, dependent on the finding of no wider spread lesions.

The most useful form of treatment is the palliative one indicated in the report on Case 2 above, viz., by some form of lid-raising spectacles.

Addendum.—Since the above was written, Dr. Gordon Holmes has kindly re-examined Case 2, and reports that, in addition to the affection of intraocular muscles, "there is definite weakness of various muscles of limbs and face." Hence, this case does not really come into the group under consideration, but definitely belongs to the group in which there are wide-spread manifestations of disease of the central nervous system.

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DISCUSSION ON OCULAR PALSIES*

R. FOSTER MOORE said " I have a few words only to say upon two somewhat uncommon causes of ocular palsy.

First Graves's disease, and secondly spinal anaesthesia.

As regards the first, there can be no doubt, I take it, that the extreme pushing forward of the eyeball which occurs in some cases, is responsible mechanically for some restriction of the complete amplitude of movement of the eyes; it is, however, clear that in some cases another factor or other factors come into play. Cases in which a definite muscular weakness appeared to be present are reported by:—

Lang and Pringle (*Trans. Ophthal. Soc., U.K.*, Vol. VI, p. 105)
West (*Trans. Ophthal. Soc., U.K.*, Vol. VI, p. 76)
Ballet (*Rec. d'Ophtal.*, 1888, p. 321)
Bristowe (*Brain*, 1886, p. 313)
Warner (*Med. Times and Gaz.*, 1882, p. 540)
Maude (*St. Bartholomew's Hospital Reports*, 1892, Vol. XXVIII)
Voss (*Deutsch. med. Wochenschr.*, August 13, 1903)
and others.

In none of these cases has there been involvement of the internal branches of the third nerve.

I have recently had occasion to explore the orbit, in the case of a woman with Graves's disease, in whom there was general limitation of eye movements, and in whom the eyes were so proptosed that the eyelids on one side could by no means be brought together over the cornea, even under a general anaesthetic, and it was evident that if nothing were done, this eye in particular would be lost from corneal sloughing.

* Combined Meeting of the Neurological and Ophthalmological Sections of the Royal Society of Medicine, on March 10 and 11, 1921.

In the course of the removal of what fat was possible through an incision of the inferior conjunctival fornix, the inferior, external and internal recti muscles were exposed for some distance, and I was surprised to find that instead of flat ribbon-like muscles, they were oedematous and much swollen fusiform bellies.

In a case of Bristowe s ("Diseases of the Nervous System," 1888, p. 141) in which ophthalmoplegia externa had occurred and which came to autopsy, the muscles are described as being pale. Silcock (*Trans. Ophth. Soc., U.K.*, Vol. VI, 1886) made a thorough histological examination of all the orbital contents, including the muscles and nerves, in such a case. He says: "there was nothing abnormal in the orbits except a most noticeable yellowish patchy discolouration of the recti and oblique muscles, which a microscopic examination proved to be due to interfascicular fatty infiltration, the muscle fibres themselves, though somewhat pale, showing no trace of fatty degeneration." "The levatores palpebrarum markedly contrasted with the other extrinsic ocular muscles inasmuch as they were normal in colour, or perhaps merely a shade paler than normal." The vessels and nerves were all examined histologically and showed no abnormality.

It seems probable then, that when deficient movement of the eyes occurs in Graves's disease, it is due to impairment of function of the muscles as a result of their infiltration by oedema, or by fat, or perhaps by both, and that marked exophthalmos when present, will introduce a mechanical factor which will contribute towards the same effect.

With regard to the ocular palsies occurring after spinal anaesthesia: This is a somewhat rare complication, but the dependence of the paralysis upon the anaesthetic cannot be doubted. It comes on a few hours after the administration, is usually incomplete, and after persisting for a number of weeks tends slowly to be recovered from. The abducens nerve shows its vulnerability in this as in so many other conditions, for it is it alone which is usually affected. Reber (*Jl. Amer. Med. Assoc.*, July 30, 1910) reports 5 cases in 2,000 spinal anaesthesias, and has collected 36 cases from the literature. Of these 36, the sixth nerve alone was involved in 32. I have seen 2 cases, in each of which it was the sixth nerve alone which was affected. The selective involvement of this nerve is not easily explained satisfactorily, but Harvey Cushing (*Brain*, Vol. XXXIII, p. 204) suggests that here, as in other cases of indirect involvement of the sixth nerve, the paralysis is due to the relation of the nerve to the anterior inferior cerebellar or internal auditory artery. He points out, that as the nerve runs directly forwards, in many cases it is crossed ventrally and at right angles by one, or other, or both, of these arteries. He suggests that if oedema of the brain occurs, these vessels are

dragged upon, and cut into the pons somewhat like an indiarubber band, and constrict the sixth nerve to such a degree as to arrest temporarily its functions.

In a few cases the third nerve has been implicated, and if one is prepared to accept the existence of oedema of the brain as suggested by Cushing, one may suppose that when this nerve is affected, it is nipped between the superior cerebellar and the posterior cerebral arteries, with which it is in especially close relationship. And whilst this explanation may perhaps be felt to be somewhat unsatisfying, there is this to be said in its favour, that it is just these two nerves, the third and the sixth, which are notoriously apt to be indirectly affected in intracranial disease, and which are in most intimate relationship of all the cranial nerves with large arteries, and arteries, too, which being anchored ventrally by the basilar artery, tend to encircle the brain stem, and therefore are most likely to constrict the nerves."

DR. KINNIER WILSON said that with so many points of interest arising in a discussion of this sort, and so many speakers wishing to participate, he would confine his remarks to the question of a possible unilateral cranial polyneuritis. It was a subject of considerable clinical interest and importance.

Frankl-Hochwart, of Vienna, had originally described a case of what that observer called polyneuritis cranialis unilateralis, a condition in which several cranial nerves were involved on one side only, in which he had reason to suppose a toxic cause was at work. The symptoms cleared up under treatment. In the course of last year there had came under the care of Dr. Wilson, a pensioner who in Cairo developed pneumonia and pleurisy; he had had, in fact, a generalized pneumococcal infection and nearly died. When this illness was at its height, at about the end of the second week, he developed a complete paralysis of the 7th, 8th, 9th, 10th, 11th, and 12th cranial nerves on the right side only. When the man came under the speaker's care subsequently, there was unmistakable evidence of the 7th to the 12th nerves on the right side side being completely involved, motor and sensory indifferently. Syphilitic tests proved negative. The history of the case, the manner of its onset, its diffuse character, involving both motor and sensory nerves, strongly suggested it was a cranial polyneuritis of a toxi-infective character. The man was now slowly improving, and his symptoms were to some extent subsiding. In that case there happened to be no involvement of an ocular muscle or ocular nerve, but he thought the same sort of process was applicable to other cranial nerve combinations, to which the term "rheumatic" was often assigned. During last year he had seen, at King's College Hospital, two cases, one involving the 5th, 6th, and 7th, the other the 6th and the 7th, on one side only. The second of these cases was that of a girl who certainly

had a "rheumatic diathesis." There was a history of exposure to cold, and she developed the familiar Bell's palsy, apparently coupled with slight but definite 6th nerve paresis. He could not prove the nature of the case pathologically, because it cleared up under anti-rheumatic remedies; nevertheless, he suggested, in the absence of any other aetiological factor, that one was justified in thinking it might be a transient polyneuritis cranialis unilateralis. The other case was that of a slightly older girl, in whom the 5th, 6th, and 7th were involved, and he had held a similar view of her case. On examining her at the end of six months, however, he found the opposite abdominal reflex absent, and he suggested in this case there may have been a small plaque of disseminated sclerosis. He only quoted it as a contrast to the others, in order to show how difficult it was to determine the aetiological factor in these cases. Unilateral cranial polyneuritis ought to be regarded as a clinical possibility. Several cases of the kind had been described in the literature. One was by Forli, in an Italian journal. It was that of an engine-driver, who always stood and worked on the right side of his engine, and was constantly exposed to wind and rain while on his journeys. Ultimately he developed a multiple paralysis of cranial nerves on the right side, with some pain, involving the 3rd, 4th, 5th, 7th, 8th, and 12th. The symptoms disappeared following the use of anti-rheumatic remedies. There was no question of syphilis in the case. When on minute review of such cases known infections could be excluded, and when the symptoms cleared up under treatment, it was fair to suggest a slight polyneuritis. Cases of unilateral neuritis of the arm, for example, were certainly known to occur, and if accepted as a clinical possibility, why should a cranial polyneuritis unilaterialis not occur similarly?

CONTACT-ILLUMINATION IN THE EXAMINATION OF THE CORNEA AND ANTERIOR PART OF THE EYE

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Owing to the entire absence of any reflex from the clear cornea, it is not easy, for anyone unaccustomed to the method, to focus with the loupe the normal cornea under contact-illumination; it is best first to focus the pupil, and then to withdraw the loupe to the focus of the cornea, the plane of which is generally indicated by some small air-bubble or irregularity of fluid on the surface.

Ointment on the surface of the eye is a disadvantage; as is also oil, *e.g.* if an oily solution of cocain be employed, because the contours of fluid irregularities formed at the junction of water and oil themselves become illuminated. Though this is generally to be avoided I have found the use of oil on occasions serves to localise the plane of the corneal surface for purposes of appreciation of the comparative depth of a small object in the substance of the cornea; it will be found, however, that there is usually a chance air-bubble, or some fluid irregularity even of a watery surface sufficiently evident, with careful focussing, to serve for identification of surface level. Should doubt exist as to whether a given object is merely on the surface (*e.g.*, mucoid fluid) or in the substance of the cornea, the lid should, as is usual, be allowed to move over the cornea; if then there is still doubt, the contact-illuminator may be withdrawn about a centimetre from the surface, and its light falling on the corneal surface will reveal the material in its ordinary aspect, especially if the illuminator be moved until the object in question comes within the bright zone of the reflected corneal image of the source of illumination.

Of superficial conditions, the very early stage of a superficial punctate keratitis—when the patient comes up with little more than a ciliary flush, and the detection of the corneal condition is not very easy—is one which is readily revealed by peripheral contact-illumination. One may here say that minute superficial bullae, if they contain clear fluid enclosed by unbroken epithelium, are not revealed any more clearly by contact-illumination than by ordinary oblique illumination; this is to be expected because the surface reflexes of oblique illumination—usually an impediment to observation—are helpful in the detection of surface bullae in virtue of the distortion which they undergo in the presence of irregularities of surface contour. There are some forms of comparatively superficial keratitis of a diffuse nature, insidious and non-vascularized, which in their early stages, at first glance, look not unlike the surface haze of raised tension, but in which it will be readily recognized that the distribution is not uniform; and where examination with the loupe shows the haze to be just deep to the surface. The haze in some cases of keratitis of this nature shows a honeycombed type of distribution to a very pronounced degree.

I have referred to the surface haze of raised tension. If a drop of 1 per cent. cocain be instilled into an eye in which rise of tension is impending—at a stage so early that it is difficult, if it is even possible to assert, by ordinary oblique illumination, that the cornea shows definite loss of lustre, and certainly at a stage in advance of that in which the raised tension is readily appreciable to palpation with the fingers—there develops, at once or *within 5 or 6 seconds*, on the lids being held apart, a constant and characteristic appearance of

the corneal surface to peripheral contact illumination. I emphasize the rapid development of this haze; it is in no sense to be confused with a harmful drying of an unduly exposed cocainized cornea. The latter takes an appreciable time to develop; it does not develop if occasionally in the examination the lid is momentarily allowed to traverse the cornea; and lest this be used as an argument against the adoption of the method, even a careless observer is not likely to so expose a cornea as to produce severe cocain drying, since, before sufficient time can elapse for this to develop, either the patient, or the observer who is holding the lids open with the fingers, must needs relax for a momentary respite.

The rapid development of this pathological haze is one of its characteristics. As the cocain (presumably) plays a part in its production or its intensification, and as, in the mildest cases, it diminishes on momentary traverse of the moist lid over the cornea—to return with its customary rapidity on the process being repeated—one might be led to assume that the condition is analogous to a mild degree of cocain drying; but this would, one infers, be disproved by the fact that the haze develops abruptly and only to a degree commensurate with the rise of tension, and also that even though the cornea be subjected to a single exposure of longer duration than is ordinarily necessary for recognition of the condition, the intensity of the haze nevertheless does not increase beyond that degree which it assumes at its first inception. Again, the haze of a glaucoma patient increases when the eye is cocainized and exposed by insertion of a speculum on the operating table; yet the very marked dulness instantaneously gives place to a bright corneal reflex when tension is relieved even before either moisture or the lid overruns the cornea.

The haze of true cocain drying commences as scattered discrete small white patches, resembling, when magnified, flakes of rice-paper with torn edges; it leads to a swelling of the epithelium, with uneven contours, coarse and irregular in its distribution; its intensity increases with prolonged exposure of the cornea. The haze of slightly raised tension is fine, and is generally present over the whole cornea; it may or may not display the occasional clear islands in its midst so often seen in the very obvious coarse surface haze of eyes with definitely high tension. With the exception of these islands, the haze in question is very uniform, showing a faint even granulation which resembles in its degree the granulation of very finely ground glass. This appearance is generally most characteristic when the eye is first examined; after protracted examination, in at any rate the mildest cases, this haze becomes for a time less obvious—the intensity apparently lessens, and with this much of the appearance so suggestive of finely ground glass. It may be that this deferred alteration results from a physical

change in the corneal epithelium brought about by the cocain, or that, in part, manipulation of the lid over the globe exerts pressure sufficient to bring about a temporary diminution of intraocular tension. The latter possibility suggests itself because I have so often noticed the diminution of this characteristic haze when observing it in those eyes in which the slight rise of tension can be presumed to be due to defective drainage of a rather viscid aqueous, e.g., cases of iritis of moderate degree in which there is no occlusion of the pupil.

It is not suggested that this haze seen in very early cases of raised tension by contact-illumination under cocain is any different in its nature from the coarse haze of steamy cornea which is clinically familiar in more advanced cases; the only difference that exists is one of degree. I certainly think that the haze is readily detectable by contact-illumination at a stage far earlier than that at which it becomes apparent to oblique illumination, and that the routine examination of a large number of various clinical cases by this method reveals the presence of slight pathological rise of tension with greater frequency than is commonly adduced from other methods for its detection. In a large number of these cases, e.g., iritis and post-operative conditions, the tension is readily brought down to normal limits—as indicated by disappearance of the corneal haze—by simple treatment, it may be only rest in bed, perhaps with the application of heat, or, in severer cases, of leeching. The condition may frequently be seen in cases of iritis before treatment is started. After a needling of lens in an adult, almost before there is swelling of the lens to a high degree or vascular injection of the eye has become very pronounced, and certainly before tension to fingers may have become definitely full, the characteristic haze may commonly be seen by contact-illumination in its earliest prodromal stage in a comparatively quiet eye, perhaps four or five days before the case abruptly attains the stage of pronounced glaucoma. Occasionally after a recent cataract extraction, an eye may exhibit slight irritability as indicated by undue lacrimation and a slight circumcorneal flush on examination. Peripheral application of the illuminator may reveal a faint haze; the rise of tension may be due to no obvious cause, and simple treatment may readily abolish it, or perhaps deeper focussing may reveal a minute tag of capsule or some fibrils of vitreous running up towards the site of the section.

The presence of this haze in its finest degree is commonly an early sign of clinical value in incipient primary glaucoma; and in these cases the haze is especially visible against the dark background which results from the accentuated tendency exhibited by most cases of chronic primary glaucoma—even at an early stage—to ready mydriasis under the influence of weak cocain.

After the prolonged persistence of pathological tension this haze may assume appearances which are not characteristic, or it may disappear; but this does not usually occur until the affection has attained a stage at which the glaucoma is readily obvious to other clinical methods employed for its detection. The haze is an accompaniment of the early stage of pathologically raised tension; and its early detection at that stage by peripheral contact-illumination is of practical utility. The character of the haze is constant, and when its appearance has been familiarized by the examination of a few cases of fairly high tension, no difficulty will be experienced in recognizing it in the earlier stages of incipient tension. Loss of transparency of the substance of the cornea from any cause, e.g., infiltration, is no hindrance to the detection of an associated surface haze of raised tension; the two can be distinguished when present together.

There are certain pathological conditions of the cornea from which the haze in question needs discriminating, though to the observer who has familiarized himself with the appearance of the surface haze of raised tension, these do not closely simulate it. The haze of cocain drying has been referred to. Eyes in which high tension has been present over a long period may attain a permanent faint superficial nebulous condition of the cornea just beneath the epithelium. The corneae of eyes with pathologically low tension usually exhibit to a slight degree, by contact-illumination, a uniformly impaired transparency affecting, however, not the surface but the substance of the cornea. In the only three cases* of palpebral spring catarrh which I have been able to examine by this method, there has been a granular stippling over the whole cornea. The plane is superficial, though it is a little difficult to decide whether it is truly epithelial, or just sub-epithelial in level. The distribution is uniform over the cornea; the loupe reveals it as a faint and fine punctate speckling without any coalescence of its constituents, which, though minute, are discrete. The suggestion that this condition of the cornea is due to the mechanical contact of the hard fibrous elevations of spring catarrh would not seem quite to correspond with the fact that the disposition of the corneal peculiarity is uniform, being neither limited to nor intensified over that area of the cornea which is the more in contact with the affected parts of the palpebral conjunctiva. On the other hand, the explanation on mechanical grounds would seem supported by the absence of this condition in one case of bulbar spring catarrh examined.

The deep, rather pronounced haze in the substance of the cornea prone to occur in those eyes in which keratitis punctata has been present over a long period is readily distinguishable in its appearance,

*The remarks throughout this paper are on observations made solely upon ward in-patients.

apart from the fact that its distribution is generally limited to an area corresponding with that region of the corneal endothelium which is affected by the keratitis punctata. Another source of imperfect corneal transparency, deep and, I believe, only transient, is to be seen occasionally in trephined eyes, when, through long delay in re-formation of the anterior chamber, the lens has been in unduly prolonged contact with the back of the cornea.

Contact-illumination is also useful in revealing very faint superficial nebulae. Grosser conditions of the surface of the cornea, such as dense nebulae or the superficial vessels of pannus, are revealed to as great advantage, or greater, when the conditions are pronounced, by ordinary oblique illumination.

Regarding the observation of conditions in the substance of the cornea, contact illumination is best suited for the examination of fine changes. The primary detection of certain fine conditions may be difficult by oblique illumination, as for example the small track, passing through the whole corneal thickness, left after traumatic perforation by a thin object such as a needle or a small intraocular foreign body. Such a track presents when on end but little surface to oblique illumination, whereas it scatters light throughout its length if the source be one of peripheral contact. A fine nebula in the substance may be seen by oblique illumination, but it will be more readily visible by contact-illumination, and often thereby more extensive than was suspected by oblique illumination or by retinoscopy. This increase in the extent of the affected area is especially well seen around a commencing small infective focus, or an early deep ulcer, which may display a fine granular haze advancing centrifugally into the neighbouring substance. The persistence of such extended haze might account for a slight reduction in the visual acuity of an eye in which, to casual observation, the corneal nebula does not appear to encroach on the path of the central visual axis.

Perforations of the cornea which have been but mildly infected leave permanent traces which are more easily detectable than the sequelae of aseptic (e.g., surgical) penetrations; but I believe that no complete perforation, even fine and aseptic, of the clear cornea occurs which does not leave a permanent trace detectable no matter how long after. I add one reservation, that I have not made subsequent examination of cases in which the strong reparative powers of the very young infant have been able to operate; but the traces of keratome sections are to be found in adults whose history notes record operation in childhood. Keratome sections through the cornea leave a scar in which the perforations of both epithelium and endothelium are plainly visible as two distinct, slightly curved lines from the ends of which, not uncommonly, a short comma-like tail branches off at an obtuse angle. I recall

one case in which two successive operations were performed on the same eye at an interval of about ten days; the first included a keratome section through the cornea, and the second a procedure in which loss of the aqueous was inevitable. When the anterior chamber subsequently re-formed after the second operation, the pupil was not circular, and the iris in its sector opposite the keratome section was on a forward plane close against the cornea. With a light iris so close to the back of the cornea it was not easy to discriminate the component parts of the keratome scar; but contact illumination readily showed these, and also the fact that the anterior face of the iris had a linear adhesion to the gap in Descemet's membrane with which, as a result of the second operation involving loss of aqueous, it had been brought in contact before adequate time had elapsed for the endothelium to heal. A similar condition may be met with in an eye in which a forward corneal section has been made for cataract extraction, with subsequent delay in re-formation of the anterior chamber. The attachment of the iris stroma to the cornea may be linear or crenated; in the latter case a number of little conical tendrils run to the cornea, their pointed apices terminating sharply at the gap in Descemet's membrane where they are stuck to, though not incorporated with, the " wound-plug." These may each resemble in shape a bell-tent of which the thin attenuated stromal wall becomes reticulated, admitting a view in miniature of an enclosed space floored by the uveal pigment. This condition is very striking when viewed under contact-illumination with the binocular corneal microscope. The recognition that the synechiae are no more than adherent to the deep aspect of the corneal scar is of surgical significance because if, for the relief of a secondary glaucoma, their separation from the cornea is necessary, it may be effected without an actual cutting of the stromal attachments and with the minimum of maltreatment to the iris. The adhesion to the cornea, if its occurrence is not of too long standing, is so light that pressure with a flat surface or blunt edge of an instrument (e.g. *Ziegler* needle) inserted into the anterior chamber readily detaches it in a manner that is not effectual if the iris-stroma is entrapped in the depth of the corneal substance.

Corneae which are apparently clear to naked eye examination sometimes reveal fine structural peculiarities by contact illumination, such as faint grey lines in the depth of an otherwise normal cornea. Greyish stippled dots, closely crowded and apparently in the plane of Descemet's membrane, are not uncommonly seen. Most of the cases of this latter condition which I have observed have been in elderly people whose eyes were under examination for some other and incidental reason, such as senile cataract. Mr. R. Affleck Greeves tells me that he has observed these dots in the eyes

of old people, and that he has been accustomed to regard them as a senile change of a degenerative nature. One case in particular, showing orange coloured dots plentifully diffused throughout the cornea is of some interest. It was suggested that these orange dots were on the back of the cornea, and were merely detached uveal pigment; but after careful examination with the binocular corneal microscope I came to the conclusion that the orange dots in this case were in the deeper part of the cornea —and this raises the question of colour. As far as I am aware, no false artificial colour effects are produced by contact-illumination. The two coloured substances most commonly seen in abnormal situations in the anterior part of the eye are uveal pigment and blood pigment, and the appearance of these is characteristic and unmistakable—the light to chocolate brown of uveal pigment; the maroon brownish-red of reduced haemoglobin associated with blood-débris. In both instances, even though the deposits of these are very minute, the colour is vivid and conspicuous. It is by no means uncommon to see a fine peppering or dusting of uveal pigment on the back of the cornea after intraocular operations; it may or may not be associated with the commoner condition of a corresponding deposition on the anterior lens-capsule. How long it can remain unchanged I am unaware, but in some cases I have found it unaltered on re-examination several weeks afterwards; in others it has disappeared in a week or two. Blood pigment very commonly persists on the back of the cornea as a very fine peppering, of characteristic colour, long after the clinical disappearance of the hyphaema from which it took origin; its composition is very fine but uniform, and it is distributed over a greater area of the cornea than that bounded by the original hydrostatic level of the hyphaema. It may perhaps be detected by retinoscopy as a fine cloud impairing the transparency of the cornea, its composition being readily revealed by the loupe under suitable illumination.

Keratitis punctata shows very plainly by this method. When present only as a few spots at the extreme lower periphery it is apt to be overlooked unless the illuminator is placed on the sclerotic with its edge at least three or four millimetres from the limbus. From this position diffusion of light into the cornea from the illuminated substance of the sclerotic will reveal the spots of keratitis punctata against a relatively dark background. An isolated spot in this position is also apt to be overlooked unless it be borne in mind that this part of the cornea is, owing to its curvature, on a deeper focal plane than the more central part. A loupe of relatively low magnification, e.g. ×8, given good illumination is, owing to its enhanced focal depth and size of field, commonly more suitable than one of higher power for the detection of minutiae. Inflammatory keratitis punctata may be simulated by the deposition of detached

fragments of soft lens matter on the back of the cornea after needling or extraction of cataract; but such deposits are less dense in consistency, are less prone to illumination, are fainter, more fluffy and ill-defined. They are commonly associated with fragmentary detachments of soft lens matter in the aqueous to which a buoyant movement can be imparted if the end of the illuminator makes gentle pressure on the periphery of the cornea.

It may be taken as a general rule that deposits on the back of the cornea, e.g., blood pigment, uveal pigment, inflammatory keratitis punctata, reveal themselves in their natural colour aspect by contact-illumination except that under certain circumstances dependent on contrast phenomena, the depth of their colouration will vary; and the conditions determining this variation may be grouped under two headings, firstly, the illumination of the deposits and, secondly, the illumination of the background. The former depends on various factors, such as the density, translucency, relucency and colour-properties of the deposit; the latter is divided into two areas either of which may vary in its illumination—the iris according to its colour, the lens according to its transparency. Again, the amount of circumfused light reaching objects on or in the cornea will not vary much whether the illuminator be applied peripherally (on sclerotic) or more centrally on the cornea. On the other hand, these two positions of the illuminator will embrace a wide variation in the illumination of the background ranging respectively from a minimal dimness to a maximal brilliance. White translucent inflammatory keratitis punctata always appears light by contact-illuminaton. Its primary detection is best facilitated by the peripheral position of the illuminator with a consequently dimly lit background. This is especially the case when looking for the sparsely disseminated fine keratitis punctata that is associated with a background formed by a bleached iris stroma and a white cyclitic cataract; or for keratitis punctata against a background of white flocculent soft lens-matter. Deposit which is denser and of dark colour is well seen when the illuminator is more central and the background consequently vivid. Intermediately there may occur faintly coloured partially translucent deposit which will appear light or dark in the same eye according as the illuminator is applied peripherally or centrally. I have seen faintly coloured keratitis punctata in an eye from which a cyclitic cataract had recently been extracted with iridectomy; as may occur after iridectomy, a sparse fine dusting of brown uveal pigment could be detected on the back of the cornea and some of this appeared to have aggregated itself in greater density to the pre-existing spots of inflammatory keratitis punctata which, though before the operation they were white, now exhibited a tinge of colour.

There is a particular method of using the illuminator when it is

desired to ascertain the depth of a small object in the cornea. The observer looks, from the side, tangentially across the cornea, at the same time applying the illuminator to the cornea close to but on the far side of the object under observation; he can then with the loupe see the corneal thickness from the flank magnified to a far greater extent than is possible when it is viewed in foreshortened perspective from the front. This method is useful to estimate the depth of a foreign-body in the cornea, especially when there is some overlying infiltration of the tissue between the foreign-body and the surface. When the anterior chamber is very shallow, it may be difficult to differentiate between keratitis punctata on the back of the cornea and white spots (inflammatory exudate, localized capsular proliferation) on the anterior lens capsule, but the distinction is greatly facilitated by this tangential view.

The conditions of the cornea so far referred to are fine ones. Contact-illumination is not suitable for the examination of coarse changes in the cornea, be they superficial or deep, *per se;* but where there are gross corneal changes into the depth of which or deep to which it is desired to seek for other and finer changes, this illumination is of good service. For example, a foreign body will show up in its natural colour—coal-dust black, steel bright and *glistening*—when the superficial infiltration liable to follow the unsuccessful attempt at its removal renders ordinarily its detection difficult. Siderosis in the cornea may much obscure the fragment of steel to which its presence is due. In these cases the illuminator is applied to the cornea with its edge within about three or four millimetres of the spot where the suspected foreign body lies; and, as stated above, a tangential direction of the observer's gaze is commonly helpful. The deep vessels of interstitial keratitis or their old tracks may generally be detected when the associated nebulation is even dense. An anterior synechia attached to the back of an extensive and dense corneal leukoma can well be seen if, with the illuminator applied to the leukoma, the observer takes his view of the anterior chamber (which is thereby brightly lit up) tangentially through any clearer peripheral part of the cornea. The observation, behind the infiltration surrounding a small corneal wound, of a tag of lymph in the anterior chamber running up to the wound may indicate that the wound is of recent occurrence; and in demonstrating the penetrating nature of the wound it may serve as inferential evidence of the presence of an intraocular foreign body.

There is one class of case in which this illumination is of value—those borderline cases in which, with raised tension and hazy cornea, evidence of inflammatory products in the anterior chamber is being sought to decide whether or not the glaucoma is primary or secondary, and consequently which of such opposite alternatives, miotic or

mydriatic, shall be chosen in treatment. Keratitis punctata, hyperaemia, vascularization and inflammatory nodules of the iris, posterior synechiae—which may take the form of merely the minutest tapering tag of brown uveal pigment—detached pigment and inflammatory exudate on the anterior lens-capsule may all be seen by contact-illumination through a cornea which is hazy to a fairly intense degree. I recall one patient in particular who gave a history of recurrent mild attacks of lacrimation and redness; when seen in one of these attacks, the eye had the aspect of a mild subacute primary glaucoma—hazy cornea and shallow anterior chamber, with a small pupil resulting from eserin which had been instilled for some days before he attended the hospital. The other eye had been lost as the result of an accident, and therefore presumptive evidence for or against an anatomical predisposition to primary glaucoma from examination of the second eye was not available in this case. Contact-illumination revealed, through the corneal haze, two very small spots of keratitis punctata on the back of the cornea, and a very small comma-like tag of pigment on the lens capsule, too slender to distort the circular shape of the pupil. First homatropin tentatively, and then atropin, were used with rapid improvement, dilatation of the pupil at the same time revealing a few detached specks of uveal pigment on more peripheral parts of the lens capsule. The case was kept on atropin and eventually recovered, with V. 6/6 and a full field. In the case quoted, and in some others which I have seen of a similar nature, the finer evidence in the anterior chamber of irido-cyclitis was not easily detectable by oblique illumination. It is true that however hazy the cornea may be, it is generally possible by oblique illumination to detect distortion of the pupillary shape; but posterior synechiae sufficiently pronounced to distort the pupil are not a necessary accompaniment of an irido-cyclitis which is capable of causing glaucoma. It does seem that glaucoma, to which a certain eye is perhaps anatomically more disposed from having a shallow anterior chamber, may be precipitated by a very mild degree of irido-cyclitis which, occurring in a more normally constructed eye, would produce no such effect. If the keratitis punctata and posterior synechiae are gross, they are evident by oblique illumination, which, however, may in these cases fail if the glaucoma surface haze is superimposed on that haze which is prone to occur in the corneal substance after the prolonged presence of coarse keratitis punctata.

Any small objects in the anterior chamber are very favourably seen by direct contact-illumination on the cornea; such are tags of lens capsule or vitreous running up to the wound after extraction, curette evacuation or needling; foreign bodies, lens matter, etc., in the aqueous. Vitreous may not uncommonly be seen protruding

through the gap in the capsular remains in an aphakic eye, as a hyaline refractile wavy material oscillating when slight pressure is exerted on the globe; it is all the more evident if entangled in it there are, as is not infrequently the case, numerous minute red specks of blood pigment similar to those so commonly to be seen adherent to the capsular remains a few weeks after extraction.

I have previously alluded to the fact that small objects such as pale fine deposits on the lens capsule are not necessarily seen at their best by the maximal illumination resulting from application of the illuminator near the centre of the cornea; a more vivid picture of a minute object on the lens is generally procured when the illuminator is placed more towards the peripheral part of the cornea in a position furthest removed from the object observed. This is particularly the case when the object is pale and colourless. More than one elementary principle recognized in art is involved in this. A photographer appreciates the value of side illumination to accentuate an object such as a tree-trunk or mountain, the object standing out much more boldly when one side of it is illuminated brightly and the other dimly, than when, with the sun behind the photographer, the bright illumination is uniformly distributed on the particular object. Again, in the absence of colour contrast, unduly vivid illumination is not always suitable for the full appreciation of effects in low relief, a fact long since recognized in sculptural art (e.g., the frieze of the Parthenon) when carvings were to be made on surfaces dimly lit. If the illuminator be placed at the edge of the cornea at say nine o'clock and the part of the iris furthest removed from it (at three o'clock) be examined with the high-power of the corneal microscope, a very beautiful picture is seen of the stromal crypts of the iris in strong relief—a picture far more striking although the illumination is dimmer than it would be with the illuminator placed on that part of the cornea more directly overlying the field under observation.

These factors also apply when a clear lens forms the back-ground to a minute object on the anterior capsule, such as the not uncommon congenital pigmented specks grouped like clumps of bacilli. If the object be fine and colourless it is seen to greater advantage with a semi-peripheral position of the illuminator, and, when the object is near the centre of the lens, with a small pupil; this is probably in part explainable by diffusion of light into the lens because, given a dilated pupil, improved visibility of the object on the lens was obtainable experimentally by rendering the rays from the illuminator convergent.

The examination by this illumination of the iris in iritis of moderate degree does suggest that much of the lack-lustre appearance of the iris is due to altered conditions of the interposed media,

such as haze of the cornea and turbidity of the aqueous. This is easily comprehended when it is considered how great may be the apparent alteration of colour (bright-green) of an iris as seen through aqueous in which a small quantity of blood-serum is disseminated.

Penetration of light into deeper planes is very effectual by contact-lighting. I have already referred to the visibility of inflammatory products in the anterior chamber when viewed through an imperfectly transparent cornea. Mr. Herbert Parsons has suggested that polarization of the light may play some part in this; at least, it is not wholly to be explained by an absence of exterior surface scattering because, for example, the iris is seen to good advantage by this method when the intervening impediment to its observation lies deep to the surface, such as increased turbidity of the aqueous or exudative casts in the anterior chamber. There are various other examples of this penetration. Often after needling of capsular remains following extraction, fine superimposed gossamer-like translucent films may be seen deep back in a pupillary region which to retinoscopy is apparently transparent. In one case with traumatic mydriasis and iridodonesis, the anterior lens capsule was visible by contact-illumination at a depth indicating backward dislocation of the lens; retinoscopy was of no avail to reveal the edge of the lens, because, presumably owing to haemorrhage into the posterior part of the vitreous, there was no red reflex. This was an isolated case; contact-lighting of the cornea is generally of no more value than are the commoner methods of observation to reveal a dislocated lens.

There is one class of case in particular where the effective penetration of this lighting is of considerable practical value, viz.: in the detection of a metallic foreign body in the lens or immediately subjacent vitreous, when the foreign body is viewed through a lens rendered semi-opaque by perforation or by siderosis about the anterior capsule. In these cases I believe that contact-lighting on the cornea seldom fails to give a striking effect, the fragment of metal standing out, clear and decisive, as a sharply defined object easily recognizable in its natural form and outline. The colour, as thus seen, is its natural one; steel is, perhaps, grey and glistening, perhaps dull-black, according to its condition. It may be confirmed that the object is metallic in that, being non-transluminous, it stands out sharp and black on scleral transillumination. Opacities of the lens of all ordinary degrees—such as mature senile cataract and those due to traumatic perforation—do not impair the red reflex of strong transillumination; even calcareous deposits do not wholly interrupt it. I believe that no other material than uveal pigment produces, by its resistance to the transillumination reflex, a blackness equal to that of an opaque foreign body in the lens.

For scleral transillumination to be efficient, when a 4-volt. lamp-filament is employed, it is best for the appliance to be so constructed that the lamp filament comes very close to the scleral surface, say within 5 millimetres; if the intervening distance is to be greater, a more powerful filament than a 4-volt. one is desirable. The use of the illuminator here described for contact-lighting is inseparably connected with its use for scleral transillumination, for which purpose, having its filament close up to the termination, it is very suitable. The whole subject of efficient transillumination is of interest, and has more practical aspects than might be inferred from the comparative infrequency with which the method is employed.

The only other abnormalities in the lens which show to advantage by contact-lighting on the cornea are localized and defined opacities; diffuse opacities of the lens show to no advantage by contact-lighting. A very effective view is to be obtained of dotted opacities scattered on different planes. The more posterior ones, often disposed in a cone corresponding with the curvature of the posterior surface of the lens, show up bright and white, as do those situated more anteriorly. Their comparative level is the more emphasized through the monocular loupe—which must be held very close to the observed eye if it is desired to focus posterior opacities—when the observer introduces parallax by oscillation of his head.

Contact-lighting on the cornea is not suited for the examination of vitreous changes unless the objects be close up behind the lens. Fibrous material when thus seen appears white, not black as by retinoscopy. An anteriorily situated malignant growth is sometimes visible by this method.

Before concluding, there are a few general points I would allude to. As regards the use of contact-lighting with the corneal microscope, an assistant is required to apply the illuminator. Some conditions seen thus are very striking, but I do not suggest that the corneal microscope serves as more than a convenient "loupe" for observation of minutiae at some leisure, except that the appliance may have a usefulness of its own on questions relating to level or depth. My impression is that nothing should be observed by the use of the binocular corneal microscope that is not primarily detectable with the monocular corneal loupe.

It may be asked if there are abnormal reflexes by contact-lighting. Only two reflex images are met with, and they are of little import. One is a small image of the face of the illuminator formed, when the pupil is large, by that sector of the lens which is furthest removed from the point of application of the illuminator. It moves with movement of the illuminator. The second is fainter, and occurs when contact is peripheral and scleral. The diffusion of light from the substance of the sclerotic around the illuminator faintly illuminates that surface of the loupe facing the sclerotic; a

faint image of the loupe is formed by the lens and can be focussed about the plane of the anterior capsule. This image undergoes distortion when the loupe is slightly twisted, and is further recognized by its intensification on the illuminator being slightly withdrawn from contact with the globe, more light being thereby reflected from the surface of the globe on to the face of the loupe. It is almost abolished if the rim of the metal mount of the loupe is blackened instead of being bright. These images are present when the eye is examined by oblique illumination, but in comparison with the bright corneal images of oblique illumination, the presence of at any rate the fainter of the two images is not always remarked.

It may be said that the plane mirror in the ophthalmoscope suitably serves for the detection of minutiae. The plane-mirror depends largely on a good red reflex being present; the picture presented by it is a colourless silhouette, passive rather than active, on one apparent plane and devoid of stereoscopic depth. Both methods have their limitations and their uses.

There is reasonable incentive to aim at any improvement in or addition to existing methods of illumination. In clinical ophthalmology, where objective examination plays such a major part, and where subtle refinement in diagnosis depends so often on the observation of minutiae, illumination is primarily the most important factor. It is not so difficult to say that a given condition is present as to confidently affirm that it is absent, consistently with quickness, and without undue mental and physical effort.

The use of the illumination here suggested should only succeed or supplement a more general survey, e.g., by oblique illumination. With a little practice in the use of the contact-illuminator it will be found that the method is one very easily manipulated. Efficiency of the apparatus is essential; though simple, it must be well made, especially at its contact end, which must have no irregularity or roughness. The glass contact piece should be thin; the lamp should abut close to it. The bulb of the lamp should be round and thin at its end through which the light must pass, and should not here present a globular thickening of glass impairing transmission of light. The filament of the lamp should lie reasonably close to the end of the bulb, and should be capable of burning brightly off a two-celled accumulator without fusing, or causing rapid carbon deposition on the inner aspect of the glass. Selection is necessary—not all the small lamps of the shape illustrated in this article, and alleged to be of a 4-volt strength, satisfy these requirements. The accumulator should be kept fully charged.

In conclusion, I may say that because, being interested in this method of illumination I have reviewed various aspects of the subject at some length, I am not thereby asserting an

exaggerated sphere of its usefulness; nor do I imply any disparagement of the ordinary methods in respect of which contact-illumination may serve as a useful adjunct on particular occasions. Such occasions are the detection of fine corneal opacities and of early keratitis punctata against a light background, or the detection of the surface haze of slightly raised tension, or the investigation of small abnormalities in the anterior chamber and lens.

I am indebted to the Surgeons of Moorfields Hospital for their courtesy in permitting me to examine and to quote from the records of their cases.

I have frequently referred both to Mr. Treacher Collins and to Mr. Herbert Parsons for their opinions and advice; the readiness with which they have accorded these is a kindness for which I am very grateful.

THE OCULAR MENACE OF WOOD ALCOHOL POISONING*

BY

DR. S. LEWIS ZIEGLER

PHILADELPHIA.

THE adoption of the National Prohibition Amendment in the United States, and the possible advent of similar restrictions in Great Britain, make the ocular complications of wood alcohol poisoning a live topic for discussion. The more we restrict the use of ethyl alcohol the greater is the temptation to substitute methyl alcohol, and so long as methyl alcohol remains the most deadly poison of daily commerce so long will human eyesight, if not life itself, be menaced by ignorant, careless or criminal handling of this toxic product. As ophthalmologists we have a double duty to perform:—(1) to make an intensive study of the toxic effects of methyl alcohol on the delicate ocular tissues, and (2) to establish a propaganda in "preventive medicine" that will protect possible victims, whether guilty or innocent.

Three fateful factors have increased the dangers of wood alcohol: (1) its *refinement* from a nauseous, vile smelling compound to one as clear and palatable as ethyl alcohol, (2) its fatal *cheapness*, which has naturally resulted from the increased output and the improved methods of manufacture, and (3) its *unusual solvent power*, which has so greatly encouraged its use in the Arts.

In America we have (1) *ethyl alcohol*, which is either absolute (99 per cent.) or rectified (90 per cent.); (2) *methyl alcohol*, which

* Read at the Oxford Ophthalmological Congress, July 15, 1920.

may be either the commercially impure liquid or the purified product, and (3) ***denatured alcohol***, which was formerly composed of 10 parts of methyl alcohol and 1/2 part of pyridin bases, added to 100 parts of ethyl alcohol, but since December, 1919, this formula has been modified by a reduction of the methyl alcohol from 10 per cent. to 2 per cent. There is a well founded suspicion that in order to evade the Prohibition Act unscrupulous chemists are submitting this denatured alcohol to fractional distillation so as to remove the benzine and wood alcohol and thus secure an impure ethyl alcohol which can be sold for drinking purposes.

In the United Kingdom this product is better regulated, and, therefore, the cases of blindness have been fewer, although it is quite possible that many cases have escaped detection and reporting. According to the "Extra Pharmacopoeia" of Martindale and Westcott for 1920, you have (1) ***ethyl alcohol*** of 99 per cent. and 90 per cent. strength; (2) ***methyl alcohol***, pure, which can only be retailed at increased cost subject to excise duty, and the impure or commercial variety which is 60 per cent. to 90 per cent. pure and is sold as ***wood naptha***," its use being forbidden in medicines and beverages but permitted in liniments, e.g., aconite, belladonna, compound camphor and soap liniments; (3) ***methylated spirits***, consisting of (a) ***mineralised alcohol***, which is a denatured product containing wood naptha 10 per cent., mineral naptha 5/8 per cent., methyl violet *q. s.* to colour, in each 100 parts of ethyl alcohol, used chiefly as a burning fluid; and (b) ***industrial alcohol***, containing 5 per cent. of wood naptha, used mostly in varnishes. The "colour indicator" is a better warning to the eye than a poison label, but both should be used to designate pure methyl alcohol and wood naptha instead of the less dangerous mineralised alcohol. The use of wood alcohol in liniments and burning fluids should be legally prohibited.

In New York, the late Dr. Gruening, in 1910, showed that wood alcohol was a fairly constant ingredient in the cheaper wines, brandies and whiskies sold in the low resorts of the East Side, in proportions varying from 24 to 43 per cent. These large percentages proved most disastrous to the victims who drank these liquors. He urged frequent analyses and regulation under the restrictions of "The National Food and Drug Act" of 1906.

In Pennsylvania, Dr. Edward Martin, Commissioner of Health, under the State Act of July, 1919, requires all manufacturers of drugs and toilet preparations to file an affidavit that the alcoholic content is pure grain alcohol, and that no wood alcohol has been used in the preparation. This has proved to be a great step forward in effective restriction, but at first there was difficulty in controlling the jobbers in barbers' supplies and the small retailers of toilet articles. The prompt closing of several stores, and the

confiscation of their adulterated goods, soon convinced the dealers that this law would be rigidly enforced.

Commercial Sources of Supply

The City Chemist of Philadelphia found methyl impurities in bay rum, lilac and violet waters, quinine and other hair tonics. Chemical analyses have also revealed its presence in Cologne spirits, spirits of lavender, Florida water, witch hazel, balsam of myrrh, paregoric, Jamaica ginger, vanilla extract, lemon extract and the essences of anise, peppermint, cinnamon and capsicum—better known as "hot drops." Well known perfumes, foreign wines, and patent medicines have also been found to be adulterated with it. In its pure state it is sold in bottles as Columbian spirits, Eagle spirits, Lion d'Or, Colonial spirits, Hastings spirits or acetone alcohol.

It has been used to fortify and preserve ginger ale, ginger beer, and bottled cider. I have seen one patient blinded by drinking a single bottle of fortified cider purchased at a country grocery store. Fourteen cases of blindness from drinking Jamaica ginger were recorded in Baltimore a few years ago. During prosecution for damages an official of the factory took a large draught to show its harmlessness, but secretly followed this with an emetic. Many Indians from our Reservations while on spree have been blinded by drinking lemon extract that was similarly adulterated. The case of sudden blindness with vomiting after drinking a single bottle of "Wincarnis Quinine Tonic" points more to methylic than to quinine toxemia, since the whole bottle contains only twelve grains of quinine, but this is dissolved in imported Spanish wine that could easily be adulterated at its source. The victim of this debauch might, however, have indulged in some other potation with methylic content.

It is the basis of all so-called "burning fluids" which are freely used in the chafing dish, to heat the vapour bath cabinet and to boil water. In rooms with poor ventilation the fumes are always dangerous.

Bathing the hands, face and head with these solutions has also been followed by toxic effects.

The "anti-freeze" mixtures, which have been sold so freely for use in the engines of motor vehicles are almost wholly composed of wood alcohol. These mixtures have often been stolen by garage employees and recklessly sold to unwary victims. It is easy to understand, therefore, what a terrific toll of sudden blindness and death followed the wood alcohol orgy in the United States during the first year of prohibition.

Many liniments and veterinary preparations have a large methylic content and may, therefore, prove dangerous. No legal restrictions have as yet been placed upon them.

The largest manufacturer of wood alcohol in America has recently designated his product "Methanol," which will at least remove the temptation of alcoholic suggestion to the confirmed drinker. When the morale of the caretaker of an anatomical museum falls so low that he will drink the alcohol off the specimens under his charge, we can understand why the significance of the word *wood* in front of the word *alcohol* will not impress the toper's vision until after he has taken a lethal dose and blindness has ensued.

We cannot prevent the "confirmed alcoholic" who is ignorant, secretive or reckless from becoming an easy prey to its poisonous effects, but we can legally prevent the ignorant or unscrupulous manufacturer from substituting methyl for grain alcohol in his pharmaceutical products, flavouring extracts and toilet preparations. Furthermore, we can by pitiless publicity, teach the public the dangers they face in drinking or otherwise using compounds containing this poison.

No restrictions have been placed on the use of wood alcohol in the Arts, and no warning has been given as to its dangers. The official reports of Great Britain show that during the year 1914 over 1,100,000 gallons were used in varnishes. We may reasonably infer that some ocular injury followed the use of such an enormous output.

As to its relative cost, the wholesaler in America buys it by the barrel at about one-eighth the price of grain alcohol. Denatured alcohol is equally cheap, but it does not cut varnish as well, and the disagreeable odour and taste prevent its use in toilet preparations and pharmaceuticals. In Great Britain, most fortunately for you, the relative wholesale prices are reversed, because wood alcohol is scarce and consequently dear; hence, pure methyl alcohol costs as much as, or even more than, ethyl alcohol. The temptation to substitute it for ethyl alcohol is, therefore, greatly lessened. You have, moreover, the distinct advantage of better and more systematic inspection and regulation which prevents the pollution of your products by careless or criminal profiteers. The one great danger to you is the possible importation from other countries of wines, whiskies, toilet articles and patent medicines that have been adulterated with wood alcohol at their place of manufacture.

The mere existence of commercial compounds containing wood alcohol constitutes a menace to the eyes and lives of the community, and their manufacture and sale should be strictly prohibited or regulated by law, punishable by fine and imprisonment. If their use is permitted, the contents should be coloured with methyl violet and a *poison label* affixed to each container stating that the use of this preparation by "drinking, breathing or rubbing on skin may cause blindness or death." Instructions should also be issued to the trades affected, calling attention to the dangers of using wood

alcohol to varnish tanks, closets or rooms where the air is confined, requiring proper ventilation and ordering employees to seek the air at stated intervals of two hours. These public duties would naturally fall to the existing Department of Health, but it is our plain duty to see that all information as to its manifest danger to vision is properly disseminated to the public. A special revenue tax should be imposed and a record of "poison sales" required for both wholesalers and retailers. The tax on denatured alcohol, should be reduced or equalized so that it can be sold cheaper than methyl alcohol thus removing the temptation to substitute because of cheapness. In addition to this the law should require that every case of wood alcohol poisoning should be reported and the source of supply revealed. I believe, however, as previously stated, that the only safe plan is to limit the manufacture of wood alcohol and regulate its sale, since it constitutes the most deadly poison used in daily commerce. Manufacturers who use this product in their business should be the first to seek a substitute and join us in this crusade to abolish its use, since they would be subjected to compensation damages if their employees were injured by its use.

Tests for Wood Alcohol

Mulliken and Scudder's Test.—In order to determine quickly the presence or absence of wood alcohol, the test of Mulliken and Scudder has often been employed but has not always proved sufficiently dependable. Nevertheless, it is a test that a travelling liquor inspector can quickly utilize. It depends on rapid oxidation by plunging a red-hot copper spiral wire into the suspected liquid, or into a distillate made from the same. Formaldehyde is thus formed and its pungent odour can be recognized by the stinging sensation it produces in the upper part of the nose. This test is only useful where the methylic strength is over ten per cent.

Robinson's Test.—A more practical method, which can be easily applied, has recently been devised by the Chemist to the Department of Public Health of Philadelphia, Dr. William C. Robinson. He converts the wood alcohol by oxidation through potassium permanganate into formaldehyde, then adds it to acidulated milk and gently heats until a pink colour develops. This test is so delicate that 1/100 of one per cent. of methyl alcohol will be revealed.

Quantitative Test

1. Take 100 cc. of the suspected methylic liquid and add sodium carbonate until it becomes alkaline.
2. Dilute this with an equal volume of water.
3. Then distil the solution.
4. Cool 100 cc. of the distillate to 60° F. and take the Sp. Gr.

5. Compare Sp. Gr. with tables to estimate percentage of alcohol by weight and volume.

6. Pour distillate into a Zeiss Immersion Refractometer and compare scale reading and reference table to ascertain whether pure ethyl alcohol, pure methyl alcohol, or a mixture is present.

7. If both are present, obtain percentages of each by applying an empiric formula (See fourth edition of Leach's "Food Inspection and Analysis," p. 782).

Qualitative Test

8. Redistil the remaining 100 cc. of distillate (para. 4 above.)

9. Take the first 10 cc. coming over and add 3 cc. of 1 per cent. solution of potassium permanganate.

10. Gently heat to 110° F. and constantly agitate the vessel until the odour of ethyl aldehyde is perceptible.

11. If the solution decolourizes add more permanganate solution, 1 cc. at a time, until pink colour is restored.

12. Add a few drops of commercial muriatic acid to precipitate the excess of permanganate (as brown manganese hydroxide) and filter.

13. Pour the colourless filtrate into a porcelain casserole and add 10 cc. each of water, fresh milk and muriatic acid.

14. Heat mixture to the boiling point with constant agitation until a bright permanent pink develops, which will occur if only 1/100 of one per cent. of wood alcohol is present in the suspected liquid.

For an emergency inspection we can modify the quantitative test outlined above by omitting the distillation. The suspected methylic liquid is thus poured directly into the hygrometer and Zeiss refractometer, and readings of specific gravity and percentages compared with reference table and empiric formula (as in Nos. 5, 6 and 7). This will roughly show the relative amounts of ethyl and methyl alcohol present.

Port of Entry through the Mouth, Nose and Skin

We should always bear in mind that wood alcohol may develop its lethal action through three different avenues of entrance into the system; (1) by ingestion, (2) by inhalation, and (3) by cutaneous absorption.

1. *Ingestion* is usually the most common method of poisoning. If taken pure, a single teaspoonful has been known to cause blindness, and an ounce to cause death. As different individuals seem to be variously affected, there may be an idiosyncrasy present that increases immunity. Thus, if three persons indulge in a wood alcohol spree, newspaper reports will usually state that "two died

and one went blind." Increase of tolerance is also acquired by long exposure to the poison, as in the case of painters.

The acute toxic symptoms that usually follow ingestion are headache, dizziness, nausea, vomiting, abdominal pain, chilliness, leaky skin, cardiac weakness, slow pulse, sighing respiration, marked physical prostration, weakness of the extremities, delirium, convulsions, stupor, and finally death. Blindness is usually noticed by the patient on the second day, when the stupor begins to wear off. Many observers have noted that early and persistent vomiting has been followed by clearing vision. In like manner prompt relief of the toxemia may avert blindness. On the other hand, blindness may ensue where acute systemic symptoms have been wholly absent. The symptoms from a single large dose, and those from repeated small doses, may show considerable variation.

2. *Inhalation* of the fumes of wood alcohol may be followed by blindness. This method of poisoning is more chronic and insidious, and has often been denied, but recorded histories verify the fact.

Loewy and von der Heide, by animal experimentation, determined that 0.2 per cent. of wood alcohol in the inspired air will cause body saturation if continued long enough. They observed, further, that the fat absorbed less of the poisonous fumes than the lean.

Buller and Wood have recorded eleven cases of poisoning by inhalation, Gruening two, Tyson three, and de Schweinitz one. I have seen two cases of poisoning by inhalation. One patient (Case III) inhaled the fumes for only one hour a day in a china-cement factory. The second patient (Case VI), inhaled the fumes for three days while varnishing the small engine room of a submarine.

The majority of these cases occur from occupational exposure to the fumes. The painter uses it as a cleansing fluid or as a cheap diluent to "cut" his shellac in order to varnish the interior of large beer vats, closets or closed rooms. Two of Tyson's cases shellaced lead pencils in a fairly large room, but finally succumbed to the slow poisoning. The hatter mixes it with shellac to stiffen his nap or straw blanks; the dyer of feathers uses it to dilute his colours; the maker of shoe polish adds it to his paste; the brass finisher uses it in his lacquer, and the maker of rubber tyres mixes his mass with it. If ventilation is very free the danger will be lessened, but open-air exercise at frequent intervals should be required for every such employee. Sooner or later some ocular injury becomes manifest in spite of every precaution.

3. *Cutaneous absorption* has also been denied, but there are many cases of recorded blindness. These have arisen chiefly from the daily application of bay rum, toilet waters and liniments. Some were caused by the washing of the face, head and hands in pure

methyl alcohol. Even Turkish bath rubbers are not exempt from toxic absorption, although they only apply it occasionally. Buller and Wood have recorded several cases, and E. V. L. Brown, in discussing Friedenberg's paper on "Wood Alcohol Amaurosis" (*Trans. Amer. Ophthal. Soc.*, 1910) relates a typical case of a painter who spilled a gallon of wood alcohol down his leg, soaking his clothes, and filling his shoe. He carelessly allowed this to dry on his skin. Toxemia and blindness resulted in a few days.

Symptomatology

The ocular symptoms are not pathognomonic, but vary within certain limitations. As a rule, vision is seriously impaired. Blindness may be early, sudden and complete. At the end of a month there may be marked recovery, which either remains permanent or is followed by gradual failure and ultimate blindness. This history of variable vision associated with gastro-intestinal symptoms is typical enough to make us suspect wood alcohol as the causative factor. When there is chronic poisoning the visual loss is more insidious, and the diagnosis is more difficult.

The objective symptoms are a sluggish, well-dilated pupil, which may or may not react to light or convergence, scleral congestion, deep pain on rotation of the globe, tenderness on finger pressure, and occasionally paresis of one or more of the extra-ocular muscles accompanied by diplopia. Sometimes the levator of the lid is involved and ptosis results.

The optic nerve-head shows many variations, but no characteristic appearance. The conditions most frequently recorded are (a) *papillitis*, (b) *retro-bulbar neuritis*, and (c) *sudden sclerosis* :—

(a) *Papillitis.* The swelling of the papilla may reach 2D. The oedema may spread over the margins on to the retina. The edges may be dusky-red with dark, dilated veins and shrunken arteries. This papillitis generally subsides in from one to two weeks. It somewhat resembles influenzal papillitis, but the latter yields more readily to hot packs or other diaphoresis, and the vision recovers more quickly and completely. Associated symptoms of intracranial pressure must, of course, be eliminated in making a diagnosis.

(b) *Retro-bulbar Neuritis.* These cases are more insidious. They are often followed by a decided shrinkage of the nerve-head, sometimes in the form of a sector-like excavation, limited to a quarter or half of the disc, glistening white in appearance, or with bluish tint, revealing the lamina cribrosa in the excavation, but usually free from connective tissue deposit. Fridenberg believes this appearance to be characteristic of this lesion ; de Schweinitz and E. V. L. Brown confirm this observation of sector atrophy of the papillo-macular bundle, but with certain modifications.

(c) *Sudden Sclerosis* may occur immediately after ingestion, and

reveals chalky white pallor of the papilla, without the slightest appearance of shrinkage. I have seen several cases of this kind and they are equally typical.

(*To be continued*).

ANNOTATIONS

Mansion House Meeting on Hospital Finance

Under the auspices of King Edward's Hospital Fund for London, a meeting of representatives of all the London Hospitals took place at the Mansion House on Wednesday, July 6, 1921, Lord Stuart of Wortley in the chair.

The object of the conference was to discuss the three schemes of "mass contributions" referred to by Lord Cave's Committee as likely to provide the key to the problem of hospital finance, namely: (A) Organized weekly contributions of wage-earners on a large scale, but without any definite insurance system; (B) the Oxford scheme, under which the contributors pay 2d. per week, and are entitled to free treatment; whereas non-contributors are expected to pay; (C) the Sussex scheme, under which, in the modified form proposed for London, the contributor pays 5d. per week and the hospital gets about as much as under the "Oxford" scheme, the payment also providing the members with other facilities, such as private consultations, dental treatment, etc.

Lord Cave's Committee gave two years for the re-establishment of the finances of the hospitals, but that pre-supposed the acceptance of their recommendation of a Government emergency grant of £1,000,000 for the first year, and possibly less in the second, whereas the Government had only suggested £500,000 for the first year conditional on the hospitals taking for themselves all possible steps to get over their financial difficulty. In other words, adopting one of the above schemes in some form or other.

Most of the representatives of the hospitals present were strongly in favour of scheme "A," but the governing bodies of The London, St. Thomas's and The Royal Free had already committed themselves to the Sussex scheme before the meeting. It is obvious that such schemes as the "Oxford" or "Sussex" scheme would not be satisfactory for the ophthalmic hospitals of London. First, because the ophthalmic hospitals of London supply a far wider area than London itself; secondly, because there could be no way of defining the areas from which contributions could be made to each individual hospital, and thirdly, that at any rate the "Sussex"

scheme embodies in it a certain amount of contract practice, in that the staff of the hospitals receive 25 per cent. of the sum collected. We think it extremely undesirable that the character of the institutions should be thus changed and that the staff who give their services voluntarily should become paid servants of the hospital, and we are wondering if the staffs of the three great hospitals above-mentioned realize the conditions which the adoption of this scheme entails.

Medical Advice to the Public

Medical Men who give gratuitous advice to the public should be very careful as to the accuracy of their statements. In a recent publication on "Venereal Diseases and their Effects," by the National Council for Combating Venereal Diseases, there is a paragraph on the "Effect of Gonorrhoea on Offspring." It is there stated that "a child born to a woman suffering from gonorrhoea runs a grave risk, during birth, of receiving the infection in the eyes. The result is the development a few days after birth of an acute inflammation of the eyes (ophthalmia neonatorum), which is a very frequent source of complete blindness." The writer goes on to state, that "This disease can be prevented if drops of 1 per cent. protargol are instilled into the child's eyes immediately after birth." As it stands this statement is grossly inaccurate, and even if there has been a printer's error in the strength of the solution, the statement is open to grave doubt. That prophylactic treatment with drugs has proved beneficial has been shown by Credé's treatment—in which, as a matter of fact, 1 per cent. *silver nitrate* was used. The routine use of such methods, however, by midwives and others, is liable to cause a false sense of security (which would certainly be increased by the above statement), and is furthermore liable to misuse and serious mistakes. Thus, we have heard of a case in which strong nitric acid was dropped into a baby's eye in mistake for a silver preparation.

In any case, seeing that presumably these pamphlets of the National Council are not circulated among medical men only, we regard it as highly undesirable that any instructions as to treatment with drugs should be given. It would have been wiser to have laid stress upon the supreme importance of immediately referring cases of this nature to treatment by competent medical men.

THE OXFORD OPHTHALMOLOGICAL CONGRESS, 1921

THE XIIth Annual Meeting of the Oxford Ophthalmological Congress was held at Oxford, on July 6, 7, 8, and 9 last.

Members met at dinner in the hall of Keble College on the evening of Wednesday, July 6.

A new departure was made this year in an extension of the proceedings to the morning of Saturday, July 9, for it was felt by the Council that with the increase in the number of contributions to the programme insufficient time was available during two days only to enable members to go carefully through the museums and in addition to attend the demonstrations and papers.

The addition of the extra day proved an unqualified success, and will be adopted at future meetings.

As in former years, the proceedings took place in the Department of Human Anatomy of the University Museum, which had been kindly placed at the disposal of the Congress by Professor Arthur Thomson, professor of human anatomy.

The majority of the members enjoyed the hospitality of Keble College, which was again available through the courtesy of the warden, the Rev. Dr. Kidd.

The advantage which accrues from a return to college life, even though for so short a time, is considerable, for opportunity is thus afforded to members for a closer acquaintance with each other than would otherwise obtain, whilst occasion can be and is made for informal discussions on Ophthalmology in general. The latter was always aimed at by the founder, the late Robert W. Doyne, and it has ever proved a profitable feature of the Congress.

The attendance was above the average and included representatives from France, Denmark, Holland, and from nearly all British Possessions, together with a larger number from the British Isles than usual.

The proceedings opened at 10 a.m. on the morning of Thursday the 7th, with a short address of welcome by the Master, Mr. Sydney Stephenson, immediately followed by a discussion on "The Causes of Infection after Extraction of Senile Cataract."

Dr. Victor Morax, who came over to open the discussion, pointed out that, with present day knowledge of operating, every surgeon should be in a position to avoid all sources of infection which come from himself, his instruments, or any liquids which he might use, but that he is not in a position wholly to prevent infection from the conjunctival sac.

Such infection may occur at any time from shortly after the operation up to fourteen days later, the more immediate being

usually the more severe and often leading to panophthalmitis. The later ones evolve iritis, irido-cyclitis, or the more severe plastic irido-cyclitis.

The most commonly found micro-organism is the pneumococcus, less frequently the staphylococcus and, rarely, the streptococcus, but in the cases of late irido-cyclitis it has been difficult to identify a micro-organism, though undoubtedly such must exist as a cause.

There is still much bacteriological work to be done in this sphere. The importance of a good operation with a clean cut incision and therefore rapidly healing wound, was emphasized, together with the advantage of the conjunctival flap.

Those who took part in the discussion were as follows: Dr. T. Harrison Butler (Leamington Spa), Mr. John Hern (Darlington), Mr. E. H. E. Stack (Bristol), Mr. P. H. Adams (Oxford), Mr. Burdon-Cooper (Bath), Mr. Rayner D. Batten (London), Mr. N. C. Ridley (Leicester), Major A. E. J. Lister, I.M.S., and Mr. Johnson Taylor (Norwich).

At the conclusion, the Annual General Meeting was held, when it was reported that 16 new members had been been elected during the past year, making a total membership of over 320, and that the Congress was in a satisfactory position financially.

An invitation from an International Congress of Ophthalmology, which would take place in America in April next, was read, and it was hoped that as many as could would accept.

In the afternoon, details were given by Mr. R. J. E. Hanson, O.B.E., of an apparatus which would afford a rapid method of estimating stereoscopic vision, especially in the case of intending candidates for Gunnery in the Royal Navy, although also of value in all spheres of work.

Mr. Arthur Greene, of Norwich, described two cases of petrosal sinus sepsis, the source of infection being, apparently, styes in the lids.

Dr. William Wallace showed a beautiful and artistic series in water-colours of fundus conditions from war injuries; a unique collection on which Dr. Wallace, as both observer and artist, is to be heartily congratulated.

Mr. Rayner D. Batten followed with an interesting series of drawings of macular conditions.

On Friday, proceedings recommenced with the Doyne Memorial Lecture, delivered this year by Mr. Ernest E. Maddox, of Bournemouth, who chose as his subject, heterophoria, on which he is a world-wide authority. Delivered with logical clearness, the Lecture should prove of the utmost value in its practical as well as theoretical aspects. At the conclusion Mr. Maddox paid a fitting tribute to the Founder of the Congress and was then presented with the Doyne Memorial Medal for the year.

Dr. Charles Russ, of London, described an interesting discovery he had made with regard to the effect produced by the human eye when directed upon a delicate electrostatic system. Several models, which had previously been seen by a number of the leading physicists, were exhibited and demonstrations of the phenomenon given.

Mr. John Hern then read a paper on his experiences of "606" and its substitutes in eye diseases.

The afternoon was spent at the Eye Hospital and was given over to the consideration of chronic glaucoma. Mr. N. C. Ridley described his "trench" operation for the relief of tension, Dr. T. Harrison Butler urged the necessity of early diagnosis and operation in the chronic forms of the disease and described his method of dealing with the acute forms. Mr. P. H. Adams (Deputy-Master) described an operative procedure which was a combination of the Lagrange and Herbert operations with a modification devised by himself, and shewed several successful cases. Mr. B. Cridland commented on some points in the performance of the Lagrange operation. An interesting discussion followed the papers.

On Saturday morning Dr. T. Harrison Butler read a paper on "Loss of vitreous during cataract extraction," a subject which aroused much interest and free discussion.

Mr. Percival J. Hay showed ophthalmic instruments and apparatus which he had devised, and also some useful coloured test-types. The value of the latter in practice was clearly explained, and the types should prove a useful adjunct in the consulting room.

A paper by Dr. Hamilton McIlroy was read, *in absentia*, on "Some points in the work of a school oculist."

The scientific and commercial museums were open daily.

Amongst exhibits in the former were the beautiful series of water-colour drawings illustrating abnormal fundus conditions shewn by Dr. William Wallace, a useful operating chair devised by Mr. P. H. Adams, together with a number of interesting pathological specimens shewn by various members.

Demonstrations of reading by the optophone were also given by a blind lady.

Ophthalmic instruments, apparatus, and new books, etc., were shewn in the commercial museum, some thirteen firms contributing stalls.

On Thursday afternoon the Congress held a garden party at Brasenose College, members being welcomed by R. W. Jeffery, Esq., M.A., the Historian of the College, and Mrs. Jeffery. A short but extremely interesting address was given by Mr. Jeffery on the history and traditions of the college.

The official dinner was held in Keble Hall on Thursday evening, July 7, and was well attended. The visitors present included the

Rev. Dr. Kidd, Warden of Keble College, Sir Archibald Garrod, Regius Professor of Medicine, and the Rev. Canon Matheson.

As a whole the meeting, favoured with fine weather, was one of the most successful yet held.

ABSTRACTS

NYCTOPSIS

(1) **Flügel, J. C.—A minor study of Nyctopsis.**

(2) **Jones, Ll. Wynn.—A method of measuring Nyctopsis, with some results.** *Brit. Jl. of Psychology*, April, 1921.

(1 and 2) These two papers are the result of war research undertaken at the psychological laboratory of University College, London, under the direction of Professor Spearman.

The authors point out that the testing of an individual's visual powers in the dark is a practice which is not usually included in the routine eyesight tests; but that during the war, and especially in relation to night flying, the possession of adequate visual powers in the dark or in reduced illumination became a matter of supreme importance.

The research was begun by **J. C. Flügel** and continued in more detail by **Wynn Jones.** Dealing with J. C. Flügel's paper in the first place, four distinct experiments were undertaken:— 1. Visual acuity in ordinary daylight; 2. Light sensitivity — the ability to distinguish light from darkness; 3. Visual acuity in dim light; 4. Visual acuity in rather brighter light.

It may here be mentioned that the tests employed by both Flügel and Wynn Jones were carried out binocularly. It has been noted that in dark adaptation summation of stimuli occurs and so this must be held in mind when comparing their results with those of other observers. However, for practical purposes the binocular result is of most service.

The following procedure was adopted in the experiments. The observer was first placed before Snellen's types and his visual acuity recorded. This was always done at mid-day so that reasonable light adaptation was obtained. He then entered the dark room and was light adapted to a uniform standard by gazing at a large white sheet, illuminated by a 1,000 candle power lamp, for two minutes. Then the lamp was extinguished and the observer waited in the darkness for one minute. The observer was stationed in a dark

room with a small window which opened into another dark room in which the observation screen was situated, so that by shutting the intervening window the observer could be cut off from the screen. The screen was placed at a distance of 2 metres from the observer's head. For test 2, a 100 candle power lamp was used. It was enclosed in a box with a small aperture which when opened allowed the rays from the lamp to illuminate a square patch of the observation screen, the patch being of a size to subtend an angle of 30 degrees at the observer's eye. The intensity of the illumination could be varied within wide limits. The rays from the lamp were intercepted at intervals by covering up the aperture of the box and the observer was told to say "dark" or "light" according to circumstance, the illumination being gradually reduced all the time.

For test 3, the object used was a circle with a square resting upon it and so appearing as an excrescence to one side of the circle. Various sizes were used and the object could be rotated so that the square could appear at any position upon the circle. The figures were cut out of white cardboard and could be fixed on the observation screen in the inner dark room. The objects were illuminated by a light of 0.1 candle power and the observer had to detect the position of the square upon the circle.

Test 4 was carried out in exactly the same way but with 0.2 candle power.

The whole procedure was completed in 2½ minutes and was repeated at 10 minute intervals until 50 minutes had elapsed from the time the observer had first entered the dark room.

The following conclusions were reached:—1. That for practical purposes dark adaptation might be considered complete after 40 minutes; 2. That for the light sensitivity test 20 minutes dark adaptation was sufficient for accurate measurements to be taken, for test 3, 10 minutes, and for test 4, 1 minute. That there appeared to be two classes of observers; those who adapted slowly at the start but eventually reached a high level of adaptation, and those who adapted quickly at the start but slowly in the later stages; 3. That visual acuity on Snellen's types does not correlate with light sensitivity at any adaptation time. This supports the theory of the dual mechanism for the two kinds of visual ability; 4. That visual acuity in daylight correlates moderately with visual acuity in dim light; 5. That light sensitivity does not correlate readily with visual acuity in dim light; 6. That visual acuity in dim light only correlates moderately well with visual acuity in rather brighter light. This suggests that an individual's acuity at one illumination is no guide to his acuity at a different illumination. Curiously enough visual acuity in daylight correlated best with visual acuity in dim light and light sensitivity best with visual acuity at the brighter illumination.

Turning now to Wynn Jones's paper, which carries on the work of Flügel, the same objects were in view, namely:—1. The relation of the daylight visual acuity to the acuity of the dark adapted eye. 2. The accurate determination of a person's sense to light in terms of stimulus intensity for various degrees of adaptation.

The instrument, which Wynn Jones devised, he calls a nyctoptometer. It consists of a rectangular wooden box, 6 in. long by 4⅜ in. broad by 3 in. high. At one end of the box there is a lamp and at the other end there are a series of windows so arranged that each window subtends an angle of 10 degrees at the lamp as also do the intervals between the windows. A metal shutter covers each of the windows. By means of these windows light from the lamp is thrown upon a screen. The screen is situated 1 metre from the lamp, and in consequence by opening different windows of the nyctoptometer different areas from the central point of the screen can be illuminated. These areas correspond to different zones of the visual field as the observer is placed immediately underneath the lamp, his cornea being on the same vertical plane as the lamp. Across the middle of the box there is a metal diaphragm to prevent light being reflected from the inside of the box. The box is placed immediately above the observer's head. The screen is made of white casement cloth stretched on a wire frame which is bent to an arc of a circle whose radius is 1 metre. A circular spot of dim red light serves as a fixation point. Wynn Jones lays stress on the necessity of using a standard lamp and a standard screen.

The investigation was carried out in the following manner:—The observer's visual acuity was first tested on Snellen's types. This was done in daylight and in addition the card was illuminated by a "Mazda" electric lamp. The observer was then taken to the instrument in a dark room and light adapted to standard by gazing for five minutes at the screen which was illuminated by a 1,000 candle power lamp. The observer was then left in darkness for two minutes, after which the windows of the nyctoptometer were opened in turn and the light gradually decreased in amount until the observer failed to notice the illuminated area on the screen. Each window of the nyctoptometer was opened in turn and a special reading for each window taken. A complete series of readings is taken and then repeated again and again until 50 minutes have elapsed. Thus the progress of dark adaptation is observed. The actual method of taking the observations is worthy of comment. The observer is told that the light will appear at any time between 1 and 11 seconds after a given signal. The observer is allowed one second for his answer. When the observer has failed three times to perceive the light it is assumed that the threshold has been passed.

For the purpose of testing the visual acuity in dark adaptation cards containing six letters of the size of the 6/9 line of Snellen's

type were used and illuminated by the central window of the nyctoptometer. In this case the initial illumination is made low and then gradually increased until the observer can read all the letters. A similar procedure is then undertaken with larger letters. Wynn Jones's experiments were made upon 12 air pilots of the R.A.F. He found that individual differences were most marked and that roughly persons can be divided into the following classes: 1. Poor adapters, both at the beginning and at the end; 2. Good adapters, both at the beginning and at the end; 3. Poor adapters at the beginning, good at the end; 4. Good adapters at the beginning, poor at the end.

The fullest information can only be given by a complete adaptation curve. The testing for light sensitivity can be confined to a region of 10 degrees around the fovea as results up to 60 degrees give much the same ranking. Beyond 60 degrees, it must be remembered, practically no binocular summation of stimuli occurs. At 20° at the temporal side of the fovea light sensitivity attains its maximum. He finds that dark adaptation for 16 minutes is sufficient for all practical purposes for testing both light sensitivity and visual acuity. He finds that an individual's visual acuity in daylight is no criterion of his light sensitivity; that visual acuity in daylight correlates moderately with visual acuity in dim lights and that visual acuity in dim light correlates highly with that in much dimmer light. Finally, that no inference can be drawn from testing an individual's light sensitivity as to his visual acuity in dim light or vice-versa.

P. G. DOYNE.

BOOK NOTICE

The Anatomy of the Human Orbit and Accessory Organs of Vision. By S. ERNEST WHITNALL, M.A., M.D., B.Ch.(Oxon), Professor of Anatomy, McGill University, Montreal; late University Demonstrator of Human Anatomy, Oxford. London: Henry Frowde and Hodder & Stoughton. Price 35s.

This is the best work on the anatomy of the orbit and its contents with which we are acquainted. It not only gathers together information which is scattered about in the ordinary text-books of anatomy and is not easily collected, but it marshals all the facts in orderly fashion and adds the results of careful original investigation. The subject is divided into three parts: osteology, the eyelids, and the contents of the orbit; to which is added a section on the cerebral connections of the nerves. The orbit is described under

the headings: the form of the orbit, the orbital margin, the walls of the orbit, the accessory air-sinuses of the nose in their relation to the orbit, the osseous lacrimal passages, table of the apertures of the orbit and the structures which traverse them, the periorbita, mensuration, development and growth, and variations, asymmetry, and deformities. Part II includes the eyebrows, the eyelids (including a section on development), the conjunctiva, and the lacrimal apparatus (glands and lacrimal passages). The contents of the orbit are exhaustively described in Part III.

The book is characterised by meticulous accuracy. Few readers, for example, will be aware that Zeis is the correct way of spelling the name of the discoverer of the glands commonly known as Zeiss's. To show, however, that the author is not infallible we find that he falls into the not unusual error of spelling distichiasis "districhiasis" (p. 154), and he tells us that a "stye" is caused by the blocking of the duct of one of Moll's glands. We only point out these errors in order that they may be corrected in a future edition.

There is little scope for originality in a work on descriptive anatomy, except in the arrangement and clear and accurate presentation of the facts. In these respects the author has been eminently successful; but his supreme merit is the beautiful photographs and lucid diagrams. There are 195 illustrations, of which a very large number are original photographs, excellently reproduced, of bones, sections, and dissections. There is a very full bibliography of papers and books published since 1900 relating to the anatomy, histology, and embryology of the subject. Professor Whitnall is to be congratulated on the success of what must have been a laborious undertaking. The book will prove invaluable to students, particularly such as are preparing for ophthalmic diplomas. It may be hoped that the demand will be large enough to justify a reduction of the somewhat alarming price.

NOTES

Death

THE death of Henry Work Dodd, after a prolonged illness, took place upon June 28th, at his house in Harley Street, at the age of 61 years. He was born at Victoria, Vancouver Island, B.C., and was the son of the late Charles Dodd. He was educated at Norwich School, under the Rev. Augustus Jessop, D.D., and studied medicine at St. Bartholomew's Hospital, London. For some years he was Clinical Assistant at The Royal Westminster

Ophthalmic Hospital, and was eventually appointed to the staff of that institution. He also held the posts of Ophthalmic Surgeon to, and Clinical Lecturer on Ophthalmic Medicine and Surgery at The Royal Free Hospital, and Ophthalmic Surgeon to The West-End Hospital for Nervous Diseases. During the existence of the Volunteer Medical Staff Corps he took an active interest in its affairs, and upon its disbandment retired with the rank of Major. His contributions to the literature of ophthalmology were mostly published in the *Transactions* of the Ophthalmological Society of the United Kingdom. He was especially interested in Freemasonry. He married Agnes, youngest daughter of James Legasick Shuter, and leaves two sons (who have both distinguished themselves) and a daughter, together with his widow to lament his loss.

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The Council of British Ophthalmologists

AT the meeting of the Council of British Ophthalmologists on Tuesday, the 5th July, the following were elected Officers for the ensuing year:—Mr. J. B. Lawford, President; Sir George Berry and Mr. E. Treacher Collins, Vice-Presidents; Mr. J. Herbert Fisher, Hon. Treasurer; Mr. M. Stephen Mayou, Hon. Secretary. *Executive Committee:* Messrs. Collins, Fisher, Parsons, and Paton, with the President and Secretary *ex-officiis*.

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Honour

THE King, on the occasion of his recent visit to Belfast, conferred the honour of knighthood upon Dr. John Walton Browne, Deputy-Lieutenant for County Antrim and Surgeon to the Belfast Ophthalmic Hospital.

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Donders

A monument was unveiled recently at Utrecht to the world-famous ophthalmologist, F. C. Donders.

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Appointment

ANGUS MACGILLIVRAY, Reader in Ophthalmology, St. Andrews University, has been appointed Assessor to the University Court of the University of St. Andrews.

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Eye and Ear Section of the Victorian Branch of the B.M.A.

AT a recent meeting of the Eye and Ear Section the question of establishing a Diploma in Ophthalmology at the University of Melbourne was discussed, and it was hoped soon to have a Diploma course established. The new Office-Bearers elected, were: President, Leonard Mitchell; Treasurer, Norman E. Gibbs; Hon. Secretary, A. D. McArthur; Committee, E. L. Grault; M. E. Lynch; and H. S. Forrest.

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American Medical Association

AT the Annual Meeting of the American Medical Association, held in Boston in June last, Dr. George E. de Schweinitz, Professor of Ophthalmology in the University of Pennsylvania, was elected President of the Association for the ensuing year.

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Sir G. A. Berry

SIR GEORGE ANDREAS BERRY, formerly President of the Royal College of Surgeons of Edinburgh, has been invited to become Unionist candidate for Parliament in the place of Sir Watson Cheyne, M.P., who, owing to ill-health, is not seeking re-election. We understand that Sir G. A. Berry has agreed to place his services at the disposal of the constituency.

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Mr. Pridgin Teale

MR. PRIDGIN TEALE, F.R.C.S., Consulting Surgeon to the Leeds General Infirmary, celebrated his ninetieth birthday on June 28th last, and was the recipient of a congratulatory address from the Court of Leeds University, in appreciation of his services to science and medicine. At one time Mr. Teale was prominently associated with ophthalmology. In 1893, he delivered the Bowman lecture. His name is associated with the removal of cataract by suction, with peritomy, etc.